A Functional Workbench for Anopheles gambiae Micro Array Analysis

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Abstract:

Insecticide resistance, a character inherited that encompasses alteration in one or more of insect's genes is now a major public health challenge combating world efforts on malaria control strategies. Anopheles has developed heavy resistance to pyrethroids, the only World Health Organization (WHO) recommended class for Indoor Residual Spray (IRS) and Long-Lasting Insecticide Treated Nets (LLITNs) through P450 pathways. We used the biochemical network of Anopheles gambiae (henceforth Ag) to deduce its resistance mechanism(s) using two expression data (when Ag is treated with pyrethroid and when controlled). The employed computational techniques are accessible by a robust, multi-faceted and friendly automated graphic user interface (GUI) tagged 'workbench' with JavaFX Scenebuilder. In this work, we introduced a computational platform to determine and also elucidate for the first time resistance mechanism to a commonly used class of insecticide, Pyrethroid. Significantly, our work is the first computational work to identify genes associated or involved in the efflux system in Ag and as a resistance mechanism in the Anopheles.

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efflux system, functional workbench, Anopheles gambiae microarray analysis, insecticide resistance, insect genes, pyrethroid, public health challenge, malaria control strategies, World Health Organization, WHO, indoor residual spray, IRS, long-lasting insecticide treated nets, LLITNs, P450 pathways, biochemical network, graphic user interface, GUI, JavaFX Scenebuilder, computational platform

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and Features extraction, Anopheles gambiae, biochemical network, Microarray data, resistance mechanism

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